ADDENDUM TO THE FIELD SAMPLING PLAN FOR THE PHASE I REMEDIAL INVESTIGATION OF OPERABLE UNIT I: THE RIVERFRONT SITE, NEW HAVEN, MISSOURI

PREPARED FOR THE
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1.0 INTRODUCTION

The U.S. Geological Survey (USGS) commenced Phase I sampling activities at the New Haven Riverfront site [Operable Unit 1 (OU-1)][1], New Haven, Missouri, in mid-December 2000. These activities will include the sampling of surface and subsurface soils outside and beneath the Riverfront building (northeast corner of the intersection of Front St. and Cottonwood St.), the collection and analysis of ground-water samples in the vicinity of the Riverfront site, and the collection and analysis of water-quality and streambed-sediment samples collected upstream and downstream of the New Haven Riverfront site from the south bank (New Haven side) the Missouri River.

This addendum to the field sampling plan for the Phase I Remedial Investigation (RI) of the Riverfront site describes the collection and analysis of water-quality and streambed-sediment samples from the Missouri River. The general activities and the number and type of samples to be collected to fulfill the RI work plan's objective to characterize the nature and extent of tetrachloroethene (PCE) contamination at the Riverfront site will be covered. The sampling of surface and subsurface soils and ground water at the Riverfront site are described in detail in the "Field Sampling Plan for the Phase I Remedial Investigation of Operable Unit I: Riverfront Site, New Haven, Missouri." Activities in this limited scope sampling plan also are covered in the following documents:

1) Work Plan for the Remedial Investigation of the New Haven Public-Water-Supply Site, New Haven, Missouri
2) General Quality-Assurance Project Plan for the Remedial Investigation of the New Haven Public-Water-Supply Site, New Haven, Missouri
3) Site Health and Safety Plan for the Remedial Investigation of the New Haven Public-Water-Supply Site, New Haven, Missouri

Methods for sample collection, field sample analysis, laboratory sample analysis, equipment to be used, and decontamination procedures used at the Riverfront site are outlined in the general quality-assurance project plan for the Riverfront site RI.

Primary RI objectives at the Riverfront site focus on determining the extent and magnitude of the PCE and volatile organic compound (VOC) contamination in the soils and ground water. A conceptual model for contamination migration that has been developed for the

[1] The entire U.S. Environmental Protection Agency project in New Haven, Missouri, is titled "The Riverfront Site" and is designated herein as the Riverfront site RI. Within this site is the Riverfront site, or Operable Unit 1, located in the downtown business district. Any further reference to the Riverfron site will be to Operable Unit 1.

Riverfront site indicates that the likely migration pathways for a dense non-aqueous phased liquid (DNAPL) are percolation (resulting from land surface disposal) and sorption onto fine-grained organic carbon-rich sediments in the upper 5 to 15 ft of the alluvium followed by downward movement of a DNAPL to the alluvium-bedrock interface where lateral transport would then dominate. The bedrock surface beneath the alluvium generally slopes toward the Missouri River and would probably direct movement of a DNAPL towards the north/northeast. Under non-flood conditions, ground water in the alluvium beneath the Riverfront site discharges into the Missouri River in the vicinity of the Missouri Department of Conservation (MDOC) boat ramp. Release of PCE from the site to the Missouri River also can occur through runoff from the site. Contaminated sediments and runoff can enter the river through a storm water drop box located at the northeast corner of the Riverfront building. This drop box discharges into a 60-inch concrete storm main that runs north to the Missouri River.

Because of the large volume of water in the Missouri River, it is unlikely that measurable impacts to the river ecosystem or streambed sediments exist. However, sampling of the water and streambed sediments in the Missouri River for PCE and others VOCs will determine if PCE migrating in ground water from the Riverfront site presents unacceptable risks to the Missouri River.

2.0 SCHEDULE OF ACTIVITIES

Sampling on the Missouri River at the Riverfront site will proceed on a schedule that produces the greatest amount of usable information regarding contaminant magnitude and extent, and provides for the best use of available equipment, personnel, and time in order to obtain the needed information. Sampling will be done twice during lower flow conditions of the River — once in late winter or early spring 2001 during high base-flow conditions and again in summer 2001 during low base-flow conditions. Sampling will not be done if high flow or flood conditions occur because of safety considerations.

Both the water and streambed-sediment samples will be collected from near the south bank of the river upstream and downstream of the MDOC boat ramp at 5 to 10 locations. Proposed sampling locations are shown in figure 1. The latitude and longitude of the sampling locations will be determined using a GPS (global positioning system). All samples will be collected from a boat equipped with the proper sampling equipment. Both water and streambed-sediment samples will be analyzed in the field and laboratory for PCE and other VOCs. In addition, field parameters [dissolved oxygen (DO), pH, specific conductance, and temperature]

will be measured in water samples. Discharge of the Missouri River will be obtained from the USGS gaging station at Herman Missouri. The water and streambed-sediment samples will not be representative of conditions in the Missouri River as a whole but will be biased toward the area (the south bank) where PCE and other VOC contamination from the New Haven Riverfront site is most likely to occur. In addition, streambed sediment sampling will be biased further toward areas where fine-grained sediments tend to collect, specifically behind the MDOC boat ramp and spur dikes (fig. 1).

3.0 STREAM SAMPLING PROTOCOL

Water samples will be collected from near the south bank of the Missouri River using a submersible pump outfitted with Teflon hose and suspended just above the sediment-water interface. The submersible pump will pump sample water using a flow rate of less than 500 mL (milliliter) per minute for a minimum of five minutes before the collection of field measurements and samples. Decontamination of the submersible pump and Teflon hose between sampling sites will be conducted by pumping several liters of a 0.1 percent liquinox-tap water mixture through the pump and hoses, followed by several liters of deionized (DI) water and several liters of native water.

Field parameters will be measured in a small beaker. The beaker will be placed adjacent to the hose outlet such that a small stream of sample water is continuously flowing into the bottom of the beaker. Care will be used to avoid excess turbulence, which may cause erroneous pH readings and DO measurements. Pumping data and field measurements will be recorded on a surface-water quality field notes form.

Samples for VOC analysis will be put into 40-mL septum-capped amber vials with no headspace. Two vials will be filled for analysis by the portable GC (gas chromatograph), and three vials will be filled for laboratory analysis. The three vials submitted for laboratory analysis will be acidified to pH less than 2 by adding two drops of concentrated VOC-free HCl (hydrochloric acid) and chilled at 4 ºC until shipment to the laboratory.

4.0 STREAMBED-SEDIMENT SAMPLING PROTOCOL

Streambed-sediment samples will be collected from stream sections containing fine-grained sediments if possible. The most likely areas for deposition of the fine-grained sediments have been determined to be behind the MDOC boat ramp and spur dikes (fig. 1). Because of the

water depth, a dredge (Eckman, ponar, or equivalent) will be used. Decontamination of the dredge between sampling sites will be done by washing with a 0.1 percent liquinox-tap water solution followed by rinsing with methanol and several liters of DI water and native water.

For laboratory VOC analysis, a minimum of three subsamples from each sampling site will be composited directly into a 4-oz plastic-capped glass jar and chilled at 4 ºC until shipment to the laboratory. The part of the sample in contact with the sampler, such as the outside of a core, will not be subsampled to avoid possible contamination from the sampler. For analysis by the portable GC, a 10 cubic centimeter (cc) disposable plastic syringe with the top removed will be used to collect approximately 5 grams (4 to 5 cc volume) of sediment sample from three separate locations in the sampler for a total of three samples for field GC analysis. The sample will be placed in a 40-mL septum-capped amber vial and sufficient organic-free water added to reach a total volume of 20 mL. The vials will be chilled at 4 ºC until analysis can be performed.

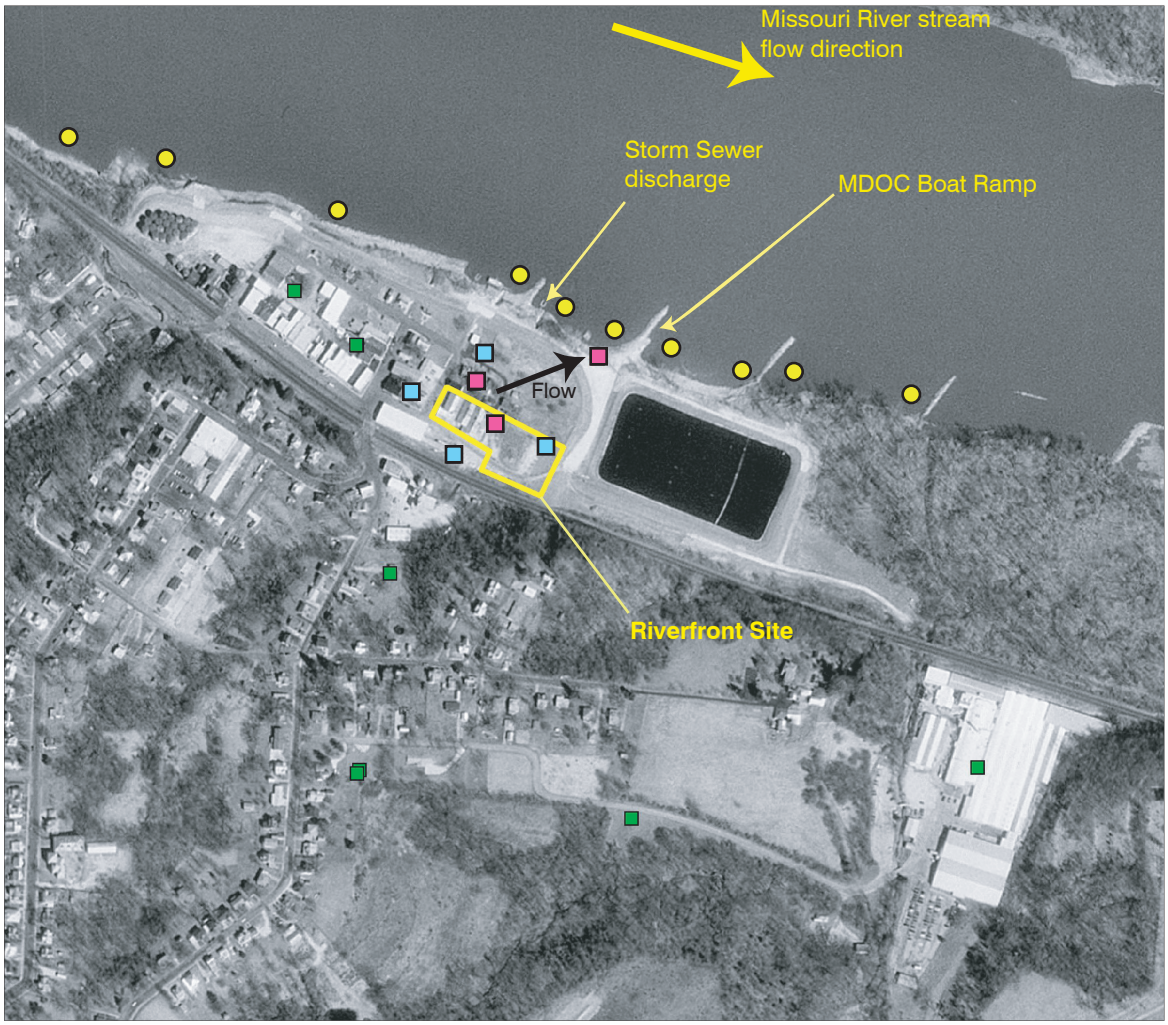

Figure 1. Proposed water and streambed-sediment sampling sites in the Missouri River in the vicinity of the Riverfront site (OU-1).